Chapter 1

Overview

The AP53 is a high-performance Pentium ®-based system board that utilizes the PCI/ISA architecture. It integrates the **Intel 430HX PCIset**, a **super I/O controller**, and a PCI mode 4 enhanced IDE controller with bus master support to enhance system performance. It has **four single in-line memory module (SIMM)** sockets that allow system memory expansion up to a maximum of **512MB**. It also supports **256KB and 512KB pipelined-burst second-level cache onboard**.

One main feature of AP53 is the green power-management function that extends energy conservation from system components to display monitor. It complies with the power-saving standards of the U.S. Environmental Protection Agency (EPA) Energy Star program.

The AP53 board measures 220 mm x 250 mm.

1.1 Specifications

Form Factor	Baby AT
Board Size	220 mm x 250 mm
CPU	Intel Pentium Processor P54C, PP/MT (P55C), AMD K5 and Cyrix 6x86
System Memory	FPM (Fast Page Mode) or EDO (Extended Data Output) 72-pin SIMM x4, maximum 512MB.
Second-level Cache	256KB or 512KB pipelined-burst cache onboard
Chipset	Intel 430HX PCIset
Expansion Slots	ISA x3 and PCI x4
Serial Port	Two serial ports UART 16C550 compatible
Parallel Port	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
Floppy Interface	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format
IDE Interface	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 and bus master hard disk drives are also supported.
USB Interface	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
PS/2 Mouse	PS/2 mouse supported by PS/2 mouse bracket.
Keyboard	Default AT compatible keyboard, mini-DIN PS/2 keyboard connector is optional.
BIOS	AMI Plug-and-Play Flash ROM BIOS
RTC & Battery	Dallas DS12887A or DS12B887 compatible

Chapter 2

Hardware Installation

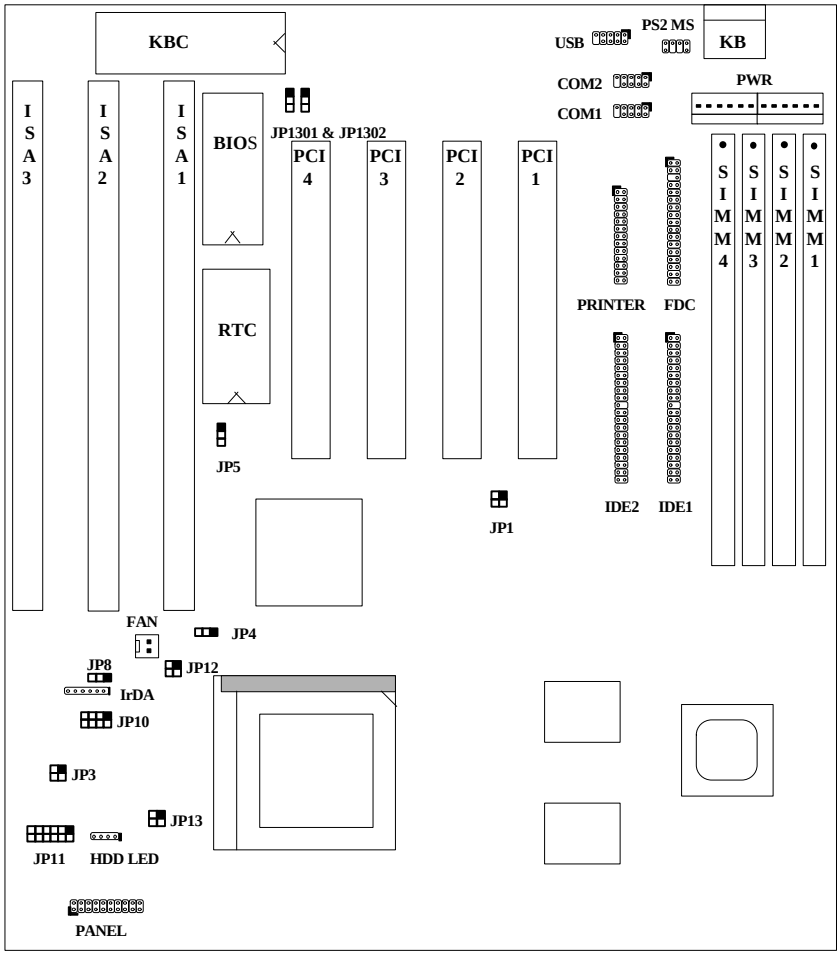
This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.

Caution: *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

1. *Do not remove a component from its protective packaging until you are ready to install it.*
2. *Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.*

2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



Jumpers:

JP11:	*CPU core voltage setting (Vcore)*
JP12:	*I/O voltage setting (Vio)*
JP3,JP13:	*CPU type (Single/Dual voltage/Vcpuio selection.)*
JP10:	*CPU frequency ratio*
JP1:	*CPU external (bus) clock*
JP4:	*Onboard PS/2 mouse enable/disable*
JP5:	*Clear CMOS*
JP8:	*Onboard Super I/O enable/disable*
JP1301,1302:	*INTEL Flash ROM programming enable/disable*

Connectors:

KB (CN2):	*AT keyboard connector*
PWR (CN3):	*AT power connector*
PS2 MS (CN4):	*PS/2 mouse connector*
USB (CN5):	*USB connector*
COM1 (CN7):	*COM1 connector*
COM2 (CN6):	*COM2 connector*
FDC (CN8):	*Floppy drive connector*
PRINTER (CN9):	*Printer connector*
IDE1 (CN10):	*IDE1 primary channel*
IDE2 (CN11):	*IDE2 secondary channel*
FAN (CN15):	*CPU fan connector*
IrDA (CN14):	*IrDA connector*
HDD LED (CN12):	*HDD LED connector*
PANEL (CN16):	*Front panel (Multifunction) connector*

2.2 Jumpers

Jumpers are made by pin headers and plastic connecting caps for the purpose of customizing your hardware. Doing so requires basic knowledge of computer hardware, be sure you understand the meaning of the jumpers before you change any setting. The onboard jumpers are normally set to their default with optimized settings.

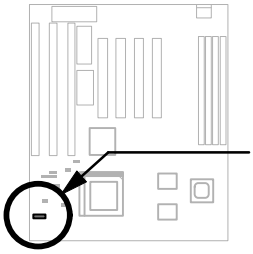
On the mainboard, normally there is a bold line marked beside pin 1 of the jumper, sometimes, there are numbers also. If we connect (short) plastic cap to pin 1 and 2, we will say set it at 1-2, and when we say jumper is open, that means no plastic cap connected to jumper pins.

Open | Short | Jumper set at 1-2 | Jumper set at 2-3

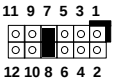
2.2.1 Setting the CPU Voltage

JP11	CPU Core Voltage (Vcore)
1-2	3.45V (default for P54C)
3-4	3.52V (Cyrix or AMD K5)
5-6	2.5V
7-8	3.2V (AMD K6-233)
9-10	2.8V (PP/MT P55C)
11-12	2.9V (AMD K6-166/200)

JP11 is used to select CPU core voltage (Vcore), normally it is set to default 3.45V for INTEL Pentium P54C. It must be changed if you have CPU with different core voltage, such as INTEL PP/MT (P55C), AMD K5/K6 and Cyrix 6x86, refer to the CPU specification for more details.



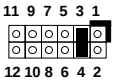
JP11



3.2V

(AMD K6-233)

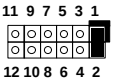
JP11



3.52V

(Cyrix 6x86 or AMD K5)

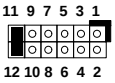
JP11



3.43V

(default for P54C)

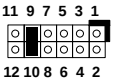
JP11



2.9V

(AMD K6-166/200)

JP11



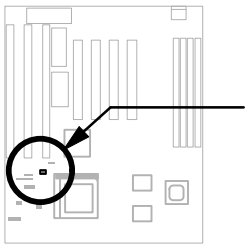
2.8V

(PP/MT P55C)

Warning: *The heat dissipation of Intel PP/MT-233Hz, AMD K6-200/233MHz exceed the original design of this mainboard. Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6-200/233 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.*

JP12	I/O Voltage (Vio)
1-2	3.43V (default)
3-4	3.52V

JP12 is reserved for test only, which sets the voltage of onboard chipset and PBSRAM (Vio). When you are using dual voltage CPU, JP12 also provides CPU I/O voltage (Vcpuio).The default is 3.43V.



JP12

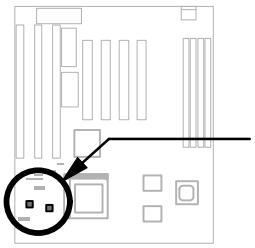
3.43V (default)

JP12

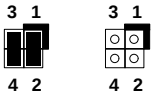
3.52V

JP3	JP13	CPU Type (Vcpuio)
1-2 & 3-4	Open	Single voltage CPU Vcpuio = Vcore (default)
Open	1-2 & 3-4	Dual voltage CPU Vcpuio = Vio (PP/MT P55C)

Set the jumper **JP3** and **JP13** according to the type of CPU. They are actually the selection of CPU I/O Voltage (Vcpuio). Normally, for single voltage CPU, Vcpuio is equal to Vcore, but for CPU that needs dual voltage such as PP/MT (P55C), Cyrix 6x86L, Vcpuio must be set to Vio, and it is different from Vcore.

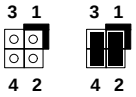


JP3 **JP13**



Single voltage
(Vcpuio = Vcore)

JP3 **JP13**



Dual voltage
(Vcpuio = Vio)

CPU Type	Vcore	Vio	Vcpuio	JP11	JP12	JP3	JP13
INTEL P54C	3.43V	3.43V	Vcore	1-2	1-2	1-2 & 3-4	Open
INTEL PP/MT	2.8V	3.43V	Vio	9-10	1-2	Open	1-2 & 3-4
AMD K5	3.52V	3.43V	Vcore	3-4	1-2	1-2 & 3-4	Open
AMD K6-166/200	2.9V	3.43V	Vio	11-12	1-2	Open	1-2 & 3-4
AMD K6-233	3.2V	3.43V	Vio	7-8	1-2	Open	1-2 & 3-4
Cyrix 6x86	3.52V	3.43V	Vcore	3-4	1-2	1-2 & 3-4	Open
Cyrix 6x86L	2.8V	3.43V	Vio	9-10	1-2	Open	1-2 & 3-4

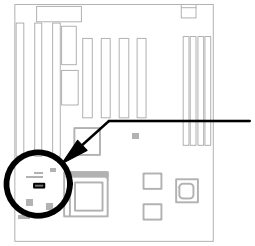
Caution: *Above table is possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

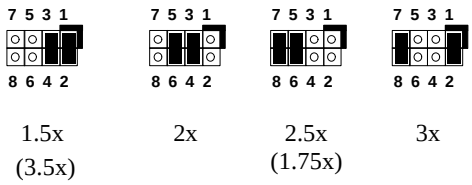
2.2.2 Selecting the CPU Frequency

JP10	CPU Frequency Ratio
1-2 & 3-4	1.5x (3.5x)
3-4 & 5-6	2x
5-6 & 7-8	2.5x (1.75x)
1-2 & 7-8	3x

Intel Pentium, Cyrix 6x86 and AMD K5/K6 CPU are designed to have different Internal (Core) and External (Bus) frequency. The ratio of Core/Bus frequency is selected by **JP10**, which CPU is using to multiply external clock and produce internal frequency.

*Core frequency = Ratio * External bus clock*

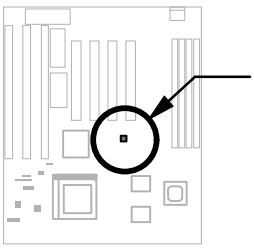


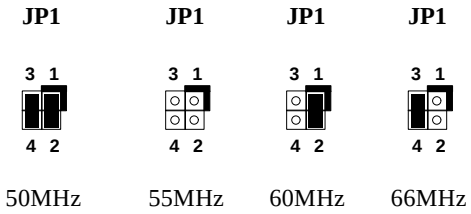


Tip: *Intel PP/MT 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio..*

JP1	CPU External Clock
1-2 & 3-4	50MHz
Open	55MHz
1-2	60MHz
3-4	66MHz

JP1 is the selections of CPU external clock (bus clock), which is actually the clock from clock generator.





Caution: *Following table are possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

Intel Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
P54C 75	75MHz =	1.5x	50MHz	1-2 & 3-4	1-2 & 3-4
P54C 90	90MHz =	1.5x	60MHz	1-2 & 3-4	1-2
P54C 100	100MHz =	1.5x	66MHz	1-2 & 3-4	3-4
P54C 120	120MHz =	2x	60MHz	3-4 & 5-6	1-2
P54C 133	133MHz =	2x	66MHz	3-4 & 5-6	3-4
P54C 150	150MHz =	2.5x	60MHz	5-6 & 7-8	1-2
P54C 166	166MHz =	2.5x	66MHz	5-6 & 7-8	3-4
P54C 200	200MHz =	3x	66MHz	1-2 & 7-8	3-4

Intel Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
PP/MT 150	150MHz =	2.5x	60MHz	5-6 & 7-8	1-2
PP/MT 166	166MHz =	2.5x	66MHz	5-6 & 7-8	3-4
PP/MT 200	200MHz =	3x	66MHz	1-2 & 7-8	3-4
PP/MT 233	233MHz =	3.5x	66MHz	1-2 & 3-4	3-4

Cyrix 6x86	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
P120+	100MHz =	2x	50MHz	3-4 & 5-6	1-2 & 3-4
P133+	110MHz =	2x	55MHz	3-4 & 5-6	Open
P150+	120MHz =	2x	60MHz	3-4 & 5-6	1-2
P166+	133MHz =	2x	66MHz	3-4 & 5-6	3-4

AMD K5	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
PR75	75MHz =	1.5x	50MHz	1-2 & 3-4	1-2 & 3-4
PR90	90MHz =	1.5x	60MHz	1-2 & 3-4	1-2
PR100	100MHz =	1.5x	66MHz	1-2 & 3-4	3-4
PR120	90MHz =	1.5x	60MHz	1-2 & 3-4	1-2
PR133	100MHz =	1.5x	66MHz	1-2 & 3-4	3-4
PR166	116MHz =	1.75x	66MHz	5-6 & 7-8	3-4

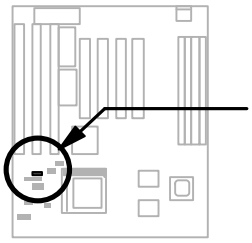
AMD K6	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
PR2-166	166MHz =	2.5x	66MHz	5-6 & 7-8	3-4
PR2-200	200MHz =	3x	66MHz	1-2 & 7-8	3-4
PR2-233	233MHz =	3.5x	66MHz	1-2 & 3-4	3-4

Note: *Cyrix 6x86 and AMD K5 CPU use P-rating for the reference of CPU benchmark compared with INTEL P54C, their internal core frequency is not exactly equal to P-rating marked on the CPU. For example, Cyrix P166+ is 133MHz but performance is almost equal to P54C 166MHz and AMD PR133 is 100MHz but performance is almost equal to INTEL P54C 133MHz.*

2.2.3 Disabling the Onboard Super I/O Controller

JP8	Onboard Super I/O
1-2	Enable (default)
2-3	Disable

The board is default to enable the onboard Super I/O controller. In case you wish to use an external I/O control card, you need to disable the onboard I/O before using the external I/O card. To disable it, set the jumper **JP8** to 2-3.



JP8

3 2 1

Enable
(default)

JP8

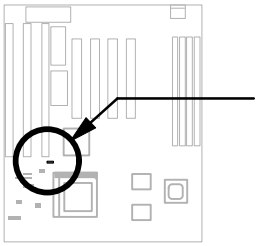
3 2 1

Disable

2.2.4 Disabling the PS/2 Mouse Function

JP4	PS/2 Mouse
Short	Enable (default)
Open	Disable

The PS/2 mouse function is normally enabled and occupies IRQ12. To reassign IRQ12 to another function, disable the PS/2 mouse function by opening jumper **JP4**.



JP4

Enable
(default)

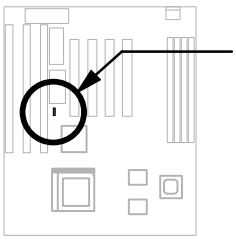
JP4

Disable

2.2.5 Clearing the CMOS

JP5	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

You need to clear the CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:



JP5

Normal Operation
(default)

JP5

Clear CMOS

Important: *Before you proceed, check your onboard CMOS chip. The clearing procedures vary depending on the CMOS chip type. Read the CMOS chip label to determine the chip type.*

For Dallas DS12887A:

1. Turn off the system power.
2. Locate **JP5** and short pins 2-3 for a few seconds.
3. Return **JP5** to its normal setting by shorting pins 1-2.
4. Turn on the system power.
5. Press [DEL] during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

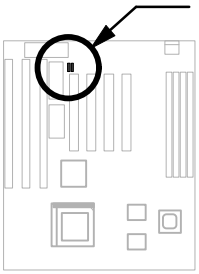
For Dallas DS12B887, Benchmarq bq3287AMT, or SGS ST M48T86:

1. Turn off the system power.
2. Locate **JP5** and short pins 2-3 for a few seconds.
3. Turn on the system power.
4. Turn off the system power again.
5. Return **JP5** to its normal setting by shorting pins 1-2.
6. Turn on the system power.
7. Press [DEL] during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

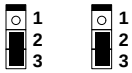
2.2.6 Enabling the INTEL Flash ROM Programming

JP1301	JP1302	Flash ROM Programming
2-3	2-3	Enable (default)

The jumpers **JP1301** and **JP1302** allow you to program the INTEL Flash ROM BIOS. Because BIOS will write back PnP ESCD configuration data, JP1301 and JP1302 must be always set to 2-3, enable programming.



JP1301 and JP1302



Enable (default)

Note: *JP1301 and JP1302 is only used for INTEL flash ROM programming, they are no effect for other type Flash ROM, such as SST or Winbond.*

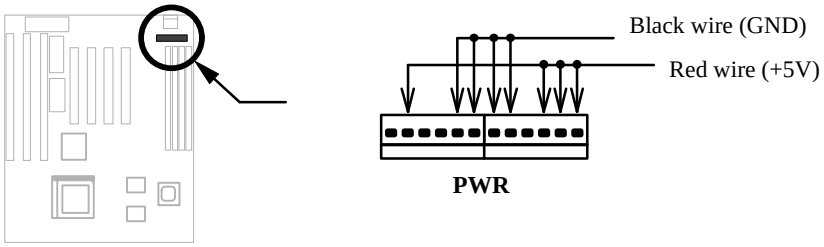
Warning: *JP1301 and JP1302 must always be enabled, fail to do so causing inconsistent BIOS code, and may damage the system.*

2.3 Connectors

2.3.1 Power Cable

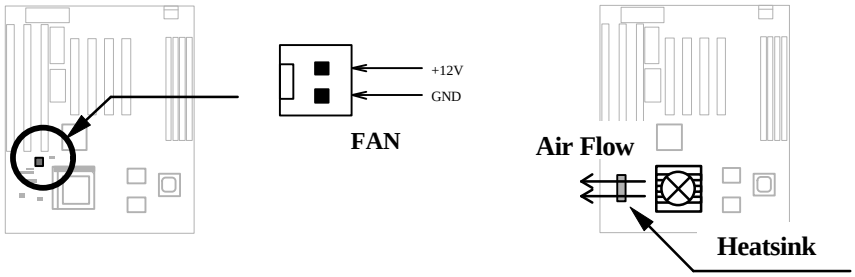
A standard baby AT (PS/2) power supply has two cables with six wires on each. Plug in these cables to the onboard power connector in such a way that all the black wires are in the center. The power connector is marked as **PWR (CN3)** on the system board.

Caution: *Make sure that the power supply is off before connecting or disconnecting the power cable.*



2.3.2 CPU Fan

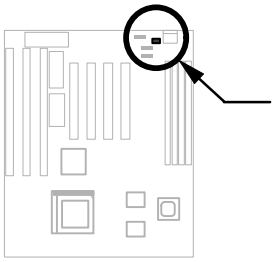
Plug in the fan cable to the two-pin fan connector onboard. The fan connector is marked **FAN (CN15)** on the system board. Attach the heatsink and fan to the CPU. Check its orientation, make sure the air flow go through the heatsink.

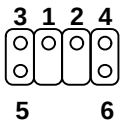


2.3.3 PS/2 Mouse

To connect a PS/2 mouse, insert the PS/2 mouse bracket connector to **PS2 MS (CN4)** on the system board. Then plug in the PS/2 mouse cable to the mouse port on the bracket.

Pin	Description
1	MS DATA
2	NC
3	GND
4	+5V
5	MS CLK
6	NC

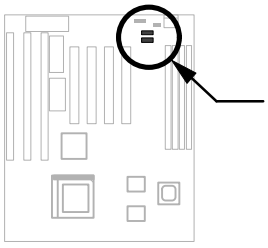


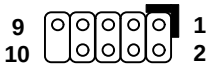


PS2 MS

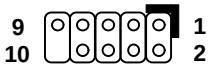
2.3.4 Serial Devices (COM1/COM2)

To support serial devices, insert the serial device connector into the serial port on the bracket. Plug in the 10-pin flat cable to the appropriate onboard connectors. The serial port 1 connector is marked as **COM1 (CN7)** and the serial port 2 connector is marked as **COM2 (CN6)** on the system board.





COM2

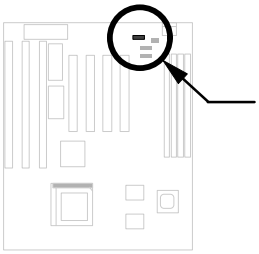


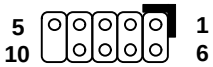
COM1

2.3.5 USB Device (optional)

You need a USB bracket to have your system to support additional USB device(s). To attach a USB bracket, simply insert the bracket cable to the onboard USB connector marked as **USB (CN5).**

Pin	Description	Pin	Description
1	V0	2	V1
3	D0-	4	D1-
5	D0+	6	D1+
7	GND	8	GND
9	NC	10	NC

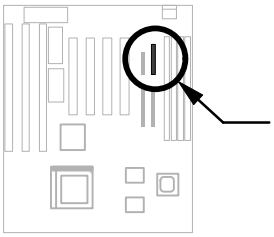


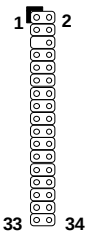


USB

2.3.6 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC (CN8)** on the system board.

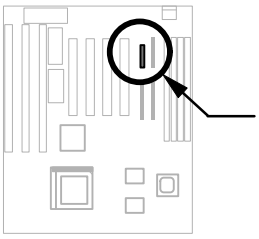


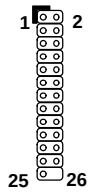


FDC

2.3.7 Printer

Plug in the 26-pin printer flat cable to the onboard parallel connector marked as **PRINTER (CN9)** on the board.





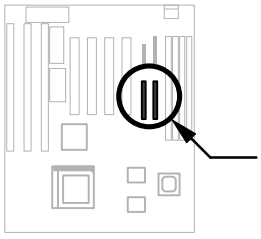
PRINTER

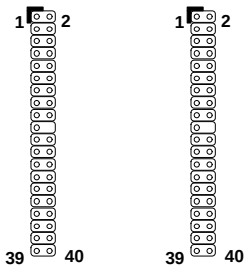
2.3.8 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1 (CN10)** and **IDE2 (CN11).** IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.

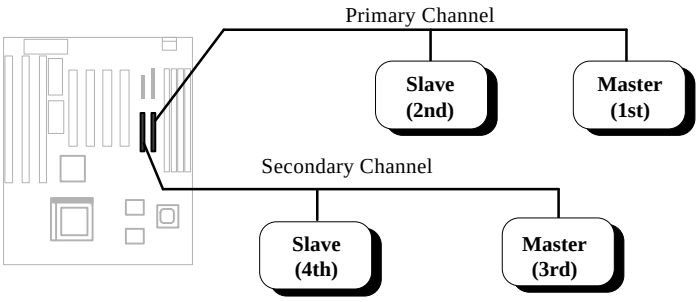




IDE2 **IDE1**

***Caution**: The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not excess this length.*

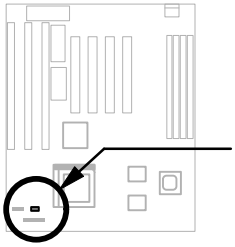
***Caution:** For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.*

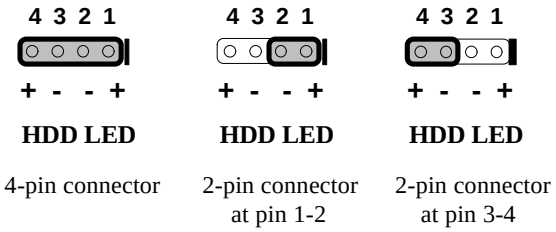


2.3.9 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED

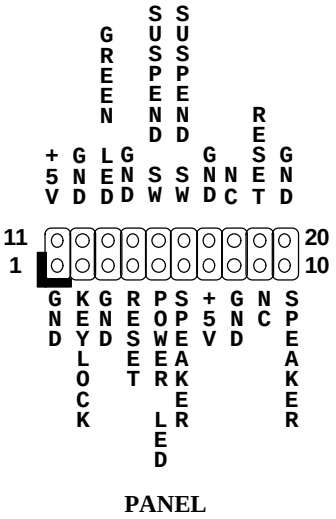




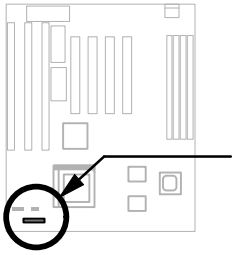
2.3.10 Panel Connector

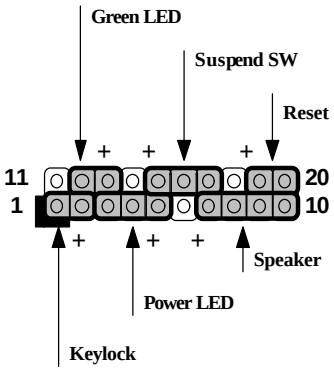
The Panel (multifunction) connector is a 20-pin connector marked as **PANEL (CN16)** on the board. Attach the power LED, keylock, speaker, reset switch, suspend switch, and green mode LED connectors to the corresponding pins as shown in the figure.

Some housings have a five-pin connector for the keylock and power LED Since power LED and keylock are aligned together, you can still use this kind of connector.



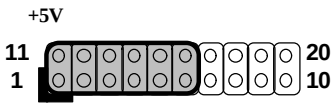
PANEL





PANEL

Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to PANEL as shown in the figure. Make sure that the red wire of the connector is connected to +5V.



PANEL

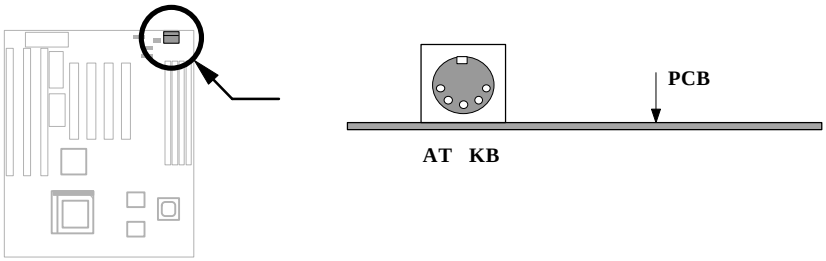
Note: *If your housing comes with Turbo switch and Turbo LED connectors, you may use these connectors for Suspend switch and Green mode LED functions, respectively.*

Note*: Pressing the Suspend switch allows you to manually force the system to suspend mode. However, this is possible only if the Power Management function in the BIOS Setup menu is enabled.*

2.3.11 Keyboard

The onboard keyboard connector is a five-pin AT-compatible connector marked as **KB (CN2)**. The view angle of drawing shown here is from back panel of the housing.

Note*: The mini DIN PS/2 keyboard connector is optional.*



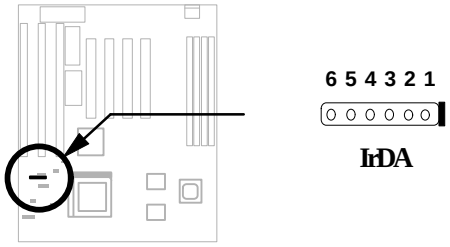
2.3.12 IrDA Connector

Serial port 2 can be configured to support wireless infrared module, with this module and application software such as Laplink, user can transfer files to or from laptops, notebooks, PDA and printers. This mainboard supports IrDA (115Kbps, 1 meter) as well as ASK-IR (19.2Kbps).

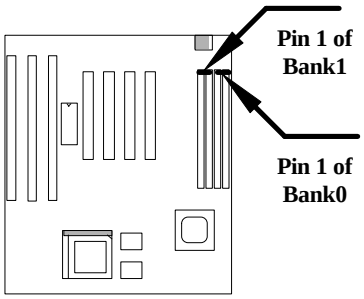
Install infrared module onto **IrDA (CN14)** connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

Pin	Description
1	+5V
2	IRRX
3	GND
4	IRTX
5	NC
6	+3.3V

***Note**: Onboard serial port 2 (COM2) will not be available afterIrDA connector is enabled.*



2.4 Configuring the System Memory



This mainboard has four 72 pin SIMM sockets (Single-in-line Memory Module) that allow you to install system memory from minimum 8MB up to maximum 512MB.

The SIMM supported by this mainboard can be identified by 4 kinds of factors:

- Size: single side, 1Mx32 (4MB), 4Mx32 (16MB), 16Mx32 (64MB), and double side, 1Mx32x2 (8MB), 4Mx32x2 (32MB), 16Mx32x2 (128MB).
- Speed: 60ns or 70ns access time
- Type: FPM (Fast page mode) or EDO (Extended data output)
- Parity: without parity (32 bit wide) or with parity (36 bit wide).

Because Pentium processor has 64 bit bus width, the four SIMM sockets are arranged in two banks of two sockets each, they are Bank0 and Bank1. Both SIMMs in each bank must be in the same size and type. It is allowed to have different speed and type in different bank, for example, 70ns FPM in one bank and 60ns EDO in another bank, in such case, each bank is independently optimized for maximum performance. The memory timing requires at least 70ns fast page mode DRAM chip, but for optimum performance, 60ns EDO DRAM is recommended.

***Warning**: The default memory timing setting is 60ns to obtain the optimal performance. Because of the specification limitation, 70ns SIMM is recommended to be used only for CPU external clock 60MHz.*

***Tip:** EDO DRAM is designed to improve the DRAM read performance. Unlike traditional fast page mode, that tri-states the memory output data to start the precharge activity, EDO DRAM holds the memory data valid until the next memory access cycle, which is similar to pipe-line effect and reduces one clock state.*

There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS. You can use any single side SIMM combination list below for, and the total memory size is to add them together, the maximum is 512MB.

SIMM1	SIMM2	Subtotal of Bank0
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

SIMM3	SIMM4	Subtotal of Bank1
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

Total Memory Size = Subtotal of Bank0 + Subtotal of Bank1

Caution: *Make sure that you install the same SIMM type and size for each bank.*

The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install SIMM. Unfortunately, there is no way that BIOS can identified the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only SIMM with chip count less than 24 chips.

Warning*: Do not install any SIMM that contains more than 24 chips. SIMMs contain more than 24 chips exceed the chipset driving specification. Doing so may result in unstable system behavior.*

Tip: *The SIMM chip count can be calculated by following example:*

1. *For 32 bit non-parity SIMM using 1M by 4 bit DRAM chip, 32/4=8 chips.*
2. *For 36 bit parity SIMM using 1M by 4 bit DRAM chip, 36/4=9 chips.*
3. *For 36 bit parity SIMM using 1M by 4 bit and 1M by 1 bit DRAM, the chip count will be 8 data chips(8= 32/4) plus 4 parity chips(4=4/1), total is 12 chips.*

Following table list the recommended DRAM combinations:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 4	None	1Mx32	x1	8	4MB	Yes
1M by 4	None	1Mx32	x2	16	8MB	Yes
1M by 4	1M by 1	1Mx36	x1	12	4MB	Yes
1M by 4	1M by 4	1Mx36	x1	9	4MB	Yes
1M by 4	1M by 4	1Mx36	x2	18	8MB	Yes
1M by 16	None	1Mx32	x1	2	4MB	Yes
1M by 16	None	1Mx32	x2	4	8MB	Yes
1M by 16	1M by 4	1Mx36	x1	3	4MB	Yes
1M by 16	1M by 4	1Mx36	x2	6	8MB	Yes
4M by 4	None	4Mx32	x1	8	16MB	Yes
4M by 4	None	4Mx32	x2	16	32MB	Yes
4M by 4	4M by 1	4Mx36	x1	12	16MB	Yes
4M by 4	4M by 1	4Mx36	x2	24	32MB	Yes

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
16M by 4	None	16Mx32	x1	8	64MB	Yes, but not tested.
16M by 4	None	16Mx32	x2	16	128MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x1	9	64MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x2	18	128MB	Yes, but not tested.

***Warning**: 64MB SIMMs using 16M by 4 bit chip (64M bit technology) are not available in the market and are not formally tested by AOpen quality test department yet. However they are supported by design specification of chipset and they will be tested as soon as they are available. Note that 64MB SIMMs using 16M by 1 bit chip (16M bit technology) have chip count exceed 24 and are strongly not recommended.*

***Tip:** 8 bit = 1 byte, 32 bit = 4 byte. The SIMM size is represented by number of data byte (whether with or without parity), for example, the size of single side SIMM using 1M by 4 bit chip is 1Mx32 bit, that is, 1M x 4 byte = 4MB. For double side SIMM, simply multiply it by 2, that is, 8MB.*

Following table are possible DRAM combinations that is **NOT** recommended:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 1	None	1Mx32	x1	32	4MB	No
1M by 1	1M by 1	1Mx36	x1	36	4MB	No
1M by 4	1M by 1	1Mx36	x2	24	8MB	No
4M by 1	None	4Mx32	x1	32	16MB	No
4M by 1	4M by 1	4Mx36	x1	36	16MB	No
16M by 1	None	16Mx32	x1	32	64MB	No
16M by 1	16M by 1	16Mx36	x1	36	64MB	No

Chapter 3

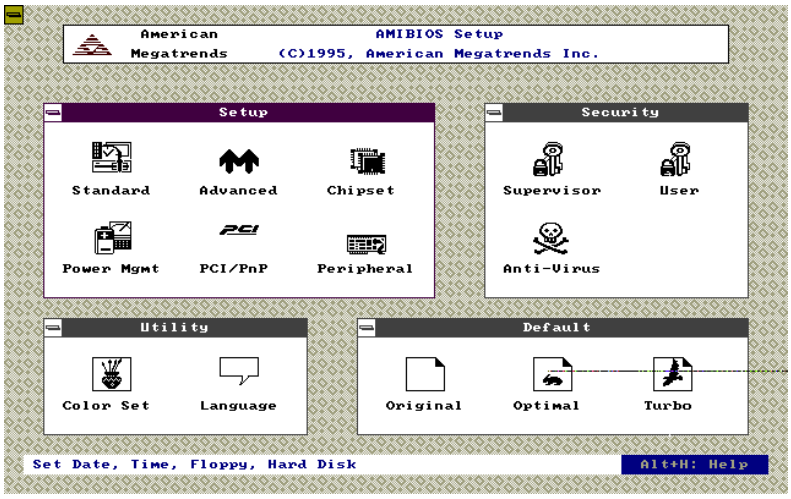
AMI BIOS

This chapter tells how to configure the system parameters. To update the BIOS ,refer to section "BIOS Flash Utility".

Important: *Because the BIOS code is the most often changed part of the mainboard design, the BIOS information contained in this chapter (especially the Chipset Setup parameters) may be a little different compared to the actual BIOS that came with your mainboard.*

3.1 Entering the AMI BIOS Setup

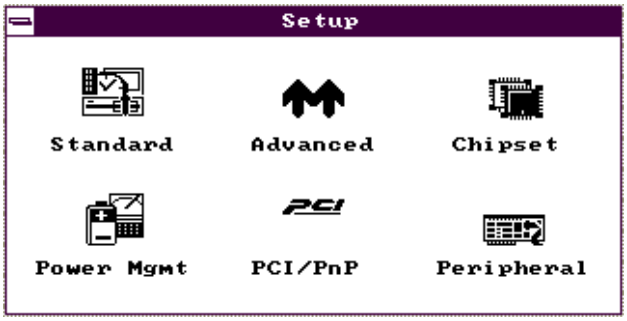
BIOS setup utility is a segment of code/routine resides in the BIOS Flash ROM. This routine allows you to configure the system parameters and save them into 128 bytes CMOS area , (normally in the RTC chip or directly in the main chipset). To enter the BIOS Setup, press **<**Del**>** during POST (Power-On Self Test). The BIOS Setup Main Menu appears as shown below.



The AMI BIOS is in Windows form. You can use either the keyboard or a mouse to move between the items. To select among the Setup menu groups, use **<**Tab**>** to highlight the selected group or simply click on the icon of the selected Setup menu. To select among the options, you can either use the arrow keys to move the highlight bar or simply click on the icon of the desired option. After making your selection, press **<**Enter**>** or double-click on the icon to open the selected menu option.

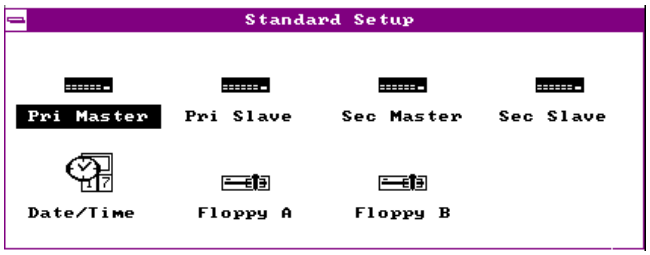
3.2 Setup Menu

The screen below shows the Setup menu window. Use the arrow keys to highlight an option.



3.2.1 Standard Setup

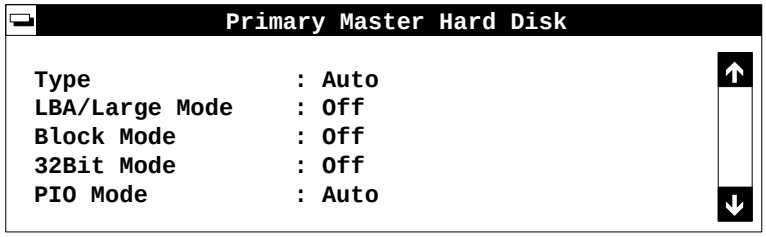
The following screen appears if you select **Standard** from the Setup options:



This Standard Setup menu allows you to setup basic information of hard disk, data/time and floppy. For hard disk parameters, choose any of following:

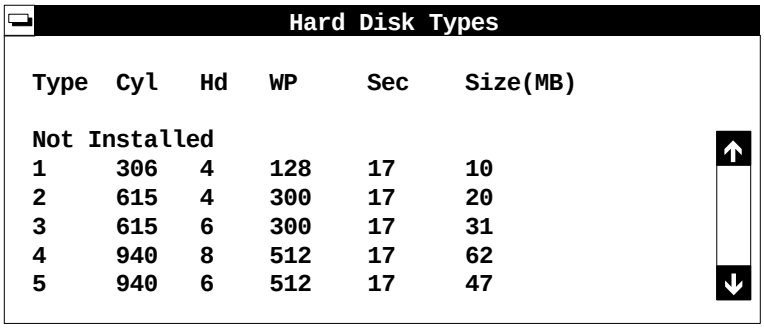
Standard -->Pri Master
Standard -->Pri Slave
Standard --> Sec Master
Standard --> Sec Slave

These items are setting of onboard IDE primary and secondary channel, each channel supports two IDE devices which are connected as master and slave. Refer to section 2.3 "Connectors" of how to connect them. The example below is for **Pri Master.**

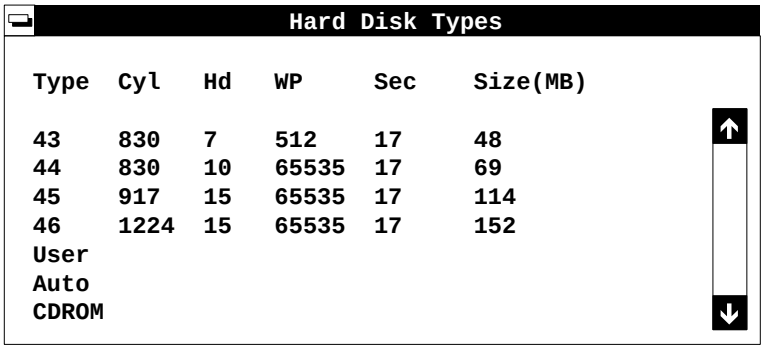


Standard -->Pri Master --> Type

When move cursor bar to Type and press <Enter> , this menu appears:



or



Type
Not Installed
1
2
...
46
User
Auto
CDROM

This item lets you set the IDE device type that your system supports. Default is **Auto** to automatically detect the installed HDD or CDROM at POST (Power-On Self Test). Select **CDROM** if you have a CDROM installed in your system. Select type **1~46** if your HDD has parameters listed on the table. Select **User** if your HDD is not on the table and you prefer to enter parameters manually. Set this to **Not Installed** if no HDD connected. Normally, use **Auto** is enough for all kinds of conditions.

Standard -->Pri Master --> LBA/Large Mode

LBA/Large
Off
On

The enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528MB. This is made possible through the Logical Block Address (LBA) mode translation. LBA is now a standard feature of current IDE hard disk on the market, because they are all above 528MB. Note if HDD is formatted with LBA On, it will not be able to boot with LBA Off.

Standard -->Pri Master --> Block Mode

Block
Off
On

This function enhances disk performance depending on the hard disk in use. If enabled, it allows data transfers in block (multiple sectors), and eliminate the interrupt handling time for each sector.

Standard -->Pri Master --> 32Bit Mode

32Bit
Off
On

Enabling this item improves system performance by using 32-bit instructions for disk access. Although IDE bus is always 16-bit, chipset will convert 32-bit instruction (command) to two 16-bit commands continuously together, and save the time to give second command. Note some old HDDs can not support too close of two 16-bit commands, if you are not sure, set it to **Off**.

Standard -->Pri Master --> PIO Mode

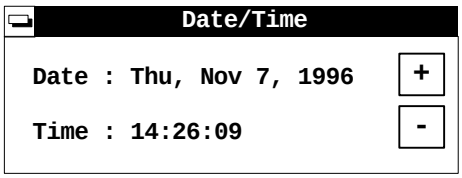
PIO
Auto
0
1
2
3
4

Setting this item to **Auto** for auto-detecting the speed of hard disk drive. PIO mode represents data transfer rate of HDD, for example mode 0 is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. In some cases, if your hard disk is unstable, you may manually try the slower mode.

***Caution**: The first IDE drive on each channel is recommended at far end side of cable. Refer to section 2.3 "Connectors" for detail.*

Standard --> Data/Time

To set the date and time, highlight **Date/Time** and press <Enter>. The following screen appears:



Use the arrow keys to move among the items. Press or click on < +> or <-> to set the current time and date.

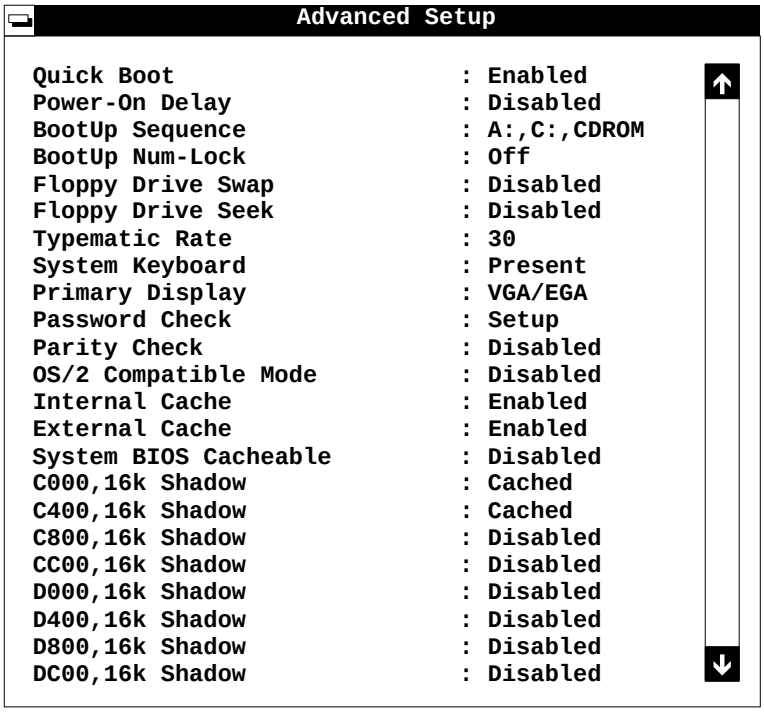
Standard --> Floppy A
Standard --> Floppy B

Floppy A
Not Installed
360KB 5.25"
1.2MB 5.25"
720KB 3.5"
1.44MB 3.5"
2.88MB 3.5"

Floppy drive type is normally auto-detected, the setting shown left are types supported by this mainboard. Floppy drive B has the same menu as drive A.

3.2.2 Advanced Setup

The following items appear if you select the option **Advanced** from the Setup menu:



Advanced --> Quick Boot

Quick Boot
Disabled
Enabled

Enable this item if you want to skip some POST (Power-On Self Test) routines during boot-up process. Set this to Disabled to let the system perform all the POST routines and follow the specified bootup sequence.

Advanced --> Power-on Delay

Power-On Delay
Disabled
2
3
...
15

This item lets you set the waiting time before system boot. Some large HDDs need more time for spindle motor to be stabilize and ready for data access. The settings are from 2 to 15 seconds.

Advanced -->BootUp Sequence

BootUp Sequence
A:,C:,CDROM
A:,CDROM,C:
C:,A:,CDROM
C:,CDROM,A:
CDROM,A:,C:
CDROM,C:,A:

The bootup sequence allows you to specify the system boot search sequence. If you need to boot from CDROM, you may set the CDROM as the first priority. The default is **A:, C:, CDROM**, but after you have installed your operating system, we recommend to use **C:,A:,CDROM**, which prevents accidentally boot virus affected diskette.

Advanced -->BootUp Num-Lock

BootUp Num-Lock
Off
On

Setting this item to On enables the numeric function of the numeric keypad. Disabling the numeric function allows you to use the cursor control keypad (arrow).

Advanced --> Floppy Drive Swap

Floppy Drive Swap
Disabled
Enabled

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.

Advanced --> Floppy Drive Seek

Floppy Drive Seek
Disabled
Enabled

When enabled, the BIOS issues seek command to floppy during POST, to move floppy drive head forward and backward.

Advanced -->Typematic Rate

Typematic Rate
Disabled
15
20
30

This item allows you to control the speed of repeated keystrokes. The default is 30 characters/sec.

Advanced --> System Keyboard

System Keyboard
Absent
Present

If there is a keyboard connected to the system, set this item to Present. Otherwise, POST will bypass the keyboard test if select Absent.

Advanced --> Primary Display

Primary Display
Absent
VGA/EGA
CGA40x25
CGA80x25
Mono

This function selects the type of video card in use. The default setting is **VGA/EGA**. Because current PCs are almost all VGA only, this item becomes almost useless.

Advanced --> Password Check

Password Check
Setup
Always

This item lets you set when to check for the password. When set to Always, a password prompt appears every time you turn-on the computer or when you enter Setup. When set to Setup, the password prompt appears when you try to enter Setup.

Advanced --> Parity Check

Parity Check
Disabled
Enabled

Set this item to Enabled if you install SIMMs with parity in your system. Otherwise, set this item to Disabled. Since the DRAM can still operate without enabling the parity scheme for SIMMs with parity, this function is normally set to **Disabled**.

Advanced --> OS/2 Compatible Mode

OS/2 Compatible Mode
Disabled
Enabled

Enable this item if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

Advanced --> Internal Cache

Internal Cache
Disabled
Enabled

This function lets you enable or disable the internal cache (The cache within CPU).

Advanced --> External Cache

External Cache
Disabled
Enabled

This function lets you enable or disable the external cache (The PBSRAM cache on the mainboard).

Advanced --> System BIOS Cacheable

System BIOS Cacheable
Disabled
Enabled

Enabling this item allows you to cache the system BIOS to further enhance system performance.

Advanced --> C000, 16K Shadow
Advanced --> C400, 16K Shadow
Advanced --> C800, 16K Shadow
Advanced --> CC00, 16K Shadow
Advanced --> D000, 16K Shadow
Advanced --> D400, 16K Shadow
Advanced --> D800, 16K Shadow
Advanced --> DC00, 16K Shadow

C000,16K Shadow
Disabled
Enabled
Cached

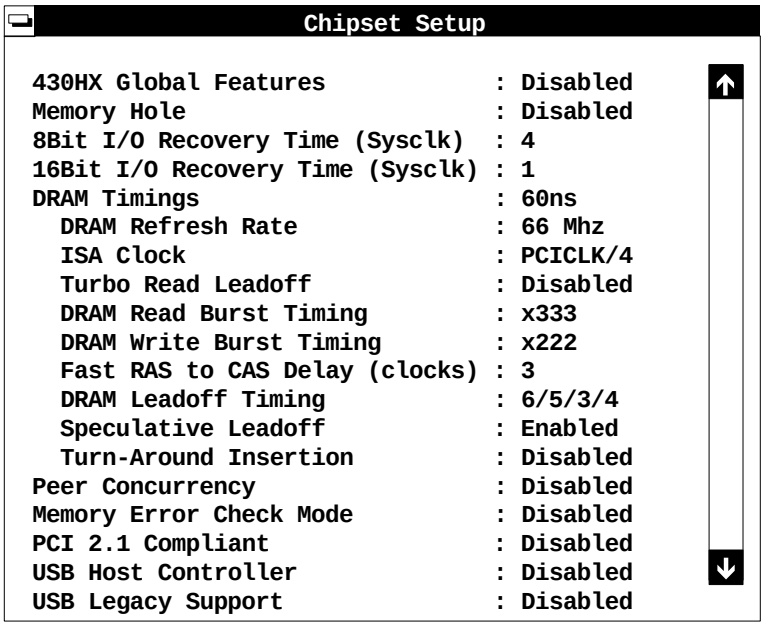
These items are for the shadow and cacheable option of ROM code on the expansion cards (including VGA). The shadow means to copy ROM code into faster DRAM and hence improves the execution performance of these ROM code. Cache them will further improve the performance but there are some cards have incompatible problem if cache its ROM code. You need to know the specific addresses of the ROM code, for example, VGA BIOS occupies segment C000 and C400, so that the default of C000 and C400 are Cached. If you do not know this information, enable all the ROM shadow settings. This ensures shadowing of any present ROMs and reduces the available memory.

Note: *The F000 and E000 segments are always shadowed because BIOS code occupies these area.*

3.2.3 Chipset Setup

The **Chipset** Setup includes settings for the chipset dependent features, especially the features related to system performance.

***Caution**: Make sure you understand the meaning of each setting before you try to change anything. The settings in this section improve system performance but may cause system unstable if the setting are not correct for your system configuration.*



Chipset --> 430HX Global Features

430HX Global Features
Disabled
Enabled

This option is a global control to enable or disable the 430HX chipset enhancement features. The Turbo default setting enables this item.

Chipset --> Memory Hole

Memory Hole
Disabled
512K-640K
15M-16M

This option lets you reserve system memory area for special ISA cards. Chipset accesses code/data of these area from the ISA bus directly, normally it is for memory mapped I/O card.

Chipset --> 8Bit I/O Recovery Time (Sysclk)

8Bit I/O Recovery Time (Sysclk)
Disabled
8
1
2
3
4
5
6
7

For some old I/O chips, when there is an I/O command finished, the device needs a specified amount of time (recovery time) before next I/O command can be started. Because of new generation CPU and mainboard chipset, the assertion of I/O command is getting faster, and sometimes shorter than specified I/O recovery time of old I/O devices. This item delays 8-bit I/O command by count of ISA bus clock, if you find any unstable 8-bit I/O card, you may try to extend the I/O recovery time by setting of this item. The BIOS default value is **4 system clocks.** If set to Disabled, the chipset will insert 3.5 system clocks.

Chipset --> 16Bit I/O Recovery Time (Sysclk)

16Bit I/O Recovery Time (Sysclk)
Disabled
4
1
2
3

The same as 8-bit I/O recovery time. This item delays 16-bit I/O command by count of ISA bus clock, if you find any unstable 16-bit I/O card, you may try to extend the I/O recovery time by setting of this item. The BIOS default value is **1 system clocks** . If set to Disabled, the chipset will auto insert 3.5 system clocks.

Chipset --> DRAM Timings

DRAM Timings
Manual
60ns
70ns

The selections for this item are 60ns, 70ns, and Manual. If you select either 60ns or 70ns, the DRAM Timing subitems become non-configurable since BIOS automatically sets the values. Select Manual if you want to specify your own item settings. The BIOS default is **60ns**.

***Warning**: The default memory timing setting is 60ns to get the optimal performance. Because the specification limitation of chipset, 70ns SIMM can only be used with CPU external clock 60MHz or below. To use 70ns SIMM with 66MHz CPU external clock may result in unstable system behavior.*

Chipset --> DRAM Refresh Rate

DRAM Refresh Rate
50 Mhz
60 Mhz
66 Mhz

This option lets you specify the clock frequency at which the chipset refreshes the DRAM to avoid data lost. The setting is normally equal to CPU bus clock (external clock).

Chipset --> ISA Clock

ISA Clock
PCICLK/4
PCICLK/3

This option specifies the ISA bus clock frequency. The selections are PCI bus clock divide by 4 or PCI clock divide by 3, PCI clock is the half of CPU bus clock, for example, 66Mhz CPU bus clock has 33Mhz PCI bus clock, and the ISA bus clock should be 33M/4= 8.25Mhz, The ISA bus clock must be near 8Mhz.

Chipset --> Turbo Read Leadoff

Turbo Read Leadoff
Disabled
Enabled

This item is reserved for cacheless configuration only. When enabled, chipset bypasses the first data input of the DRAM data pipeline buffer. Therefore, reduces one clock of DRAM read leadoff timing. The default is **Disabled.**

***Warring**: "Turbo Read Leadoff" can only be enabled for cacheless system or external cache disabled.*

Chipset --> DRAM Read Burst Timing

DRAM Read Burst Timing
x444
x333

The Read Burst means to read four continuous memory cycles on four predefined addresses from the DRAM. The default value of 60ns FPM (Fast Page Mode) DRAM is x333 which means the 2nd,3rd and 4th memory cycles are 3 CPU clocks. For EDO DRAM, the chipset will automatically reduce one clock, that is, x444 becomes x333 and x333 becomes x222. The value of x is the timing of first memory cycle and depends on the "DRAM Leadoff Timing" setting

Chipset --> DRAM Write Burst Timing

DRAM Write Burst Timing
x444
x333
x222

The Write Burst means to write four continuous memory cycles on four predefined addresses to the DRAM. This item sets the DRAM write timing of the 2nd,3rd and 4th memory cycles. There is no difference of EDO and FPM DRAM on the write burst timing. The value of x depends on the "DRAM Leadoff Timing" setting

Chipset --> Fast RAS to CAS Delay (clocks)

Fast RAS to CAS Delay (clocks)
3
2

This option specifies the wait state between the DRAM row address strobe (RAS) and column address strobe (CAS) signals. The default setting is **3 clocks**.

Chipset --> DRAM Leadoff Timing

DRAM Leadoff Timing
7/6/3/4
6/5/3/4
7/6/4/5
6/5/4/5

The Leadoff means the timing of first memory cycle in the burst read or write. Actually, this setting includes not only read/write leadoff timing but also the clocks of RAS precharge and width of refresh RAS signal. The four digital represent Read Leadoff/ Write Leadoff/ RAS Precharge/ Refresh RAS Width. For example, default is **6/5/3/4**, which means you have 6xxx DRAM read and 5xxx DRAM write, with 3 clocks RAS precharge and 4 clock refresh RAS width.

Chipset --> Speculative Leadoff

Speculative Leadoff
Disabled
Enabled

Enable this item reduce one clock of DRAM read leadoff timing by presenting the DRAM read request before the controller chip decodes the final memory target (i.e., cache, DRAM or PCI). For example, the DRAM read timing of 60ns EDO is 6-2-2-2, Enable this option improve DRAM read timing to 5-2-2-2.

Chipset --> Turn-Around Insertion

Turn-Around Insertion
Disabled
Enabled

Enabling this option allows the chipset to insert one turn-around clock cycle to the memory data bus for back-to-back memory read and write cycles. If you have large loading on the memory data bus, for example, four SIMMs with many DRAM chips on the SIMM, this option provides a safety time for data bus to switch direction.

Chipset --> Peer Concurrency

Peer Concurrency
Disabled
Enabled

Peer Concurrency enables the CPU to run DRAM or cache cycle while PCI master is accessing PCI target (slave), however, the CPU to/from PCI bus will still be blocked. If Disabled, the CPU will always be blocked when PCI master owns the PCI bus. This function is useful if you have heavy loading PCI masters on your system (such as PCI SCSI or Network card).

Chipset --> Memory Error Check Mode

Memory Error Check Mode
Disabled
Parity
ECC

This item selects the memory error check mode. The parity mode uses 1 parity bit for each byte, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with old number of "1", the parity error is occurred and this is called single bit error detection. The ECC mode needs 8 ECC bit for 64 bit data, ECC bits are updated and checked by special algorithm, the ECC algorithm has the ability to detect double bit error and automatically correct single bit error.

Tip: *Because 36 bit SIMM has 4 bit more for parity, the ECC mode can be supported by two traditional parity SIMMs, it is no need to have special ECC SIMM.*

Chipset --> PCI 2.1 Compliant

PCI 2.1 Comliant
Disabled
Enabled

This item lets you control the Passive Release or Delayed Transaction function of the PIIX3 chipset (Intel PCI to ISA bridge). Enable it complies with the PCI revision 2.1. Try to enable or disable it, if you have ISA card compatibility problem.

Chipset --> USB Host Controller

USB Host Controller
Disabled
Enabled

This item lets you enable or disable the USB function in chipset. The mainboard acts as USB host, and you can plug USB devices on the USB connector of back panel. You need USB driver to support USB devices, normally, they are provided by USB device vendors or operating system such as Win95.

Important: *The USB function shares INTD with PCI slot 4. Therefore, if you enable the USB function, only PCI cards that do not require IRQ, such as VGA, can be installed in slot 4. The PnP BIOS assigns an IRQ to VGA only if the VGA requests for it.*

Chipset --> USB Legacy Support

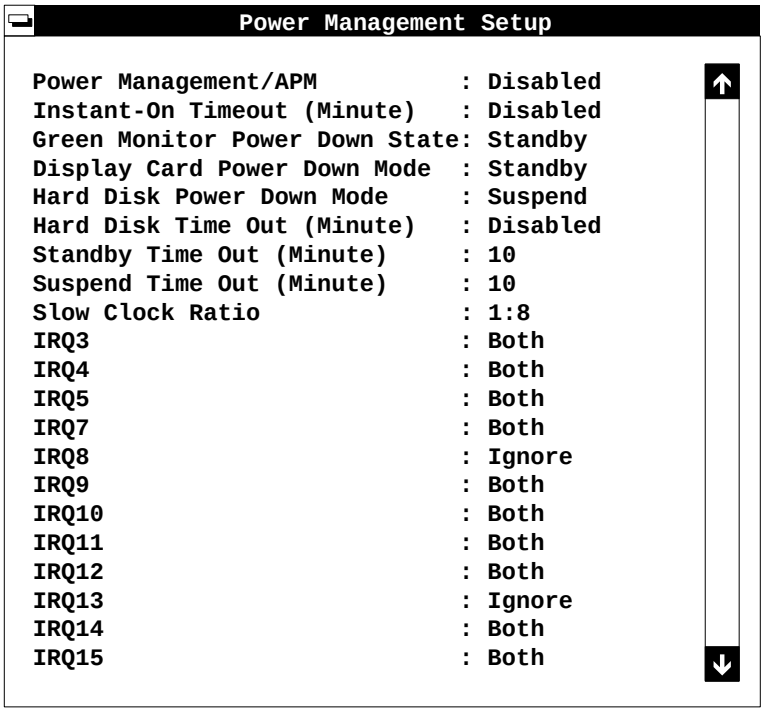
USB Legacy Support
Disabled
Enabled

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.

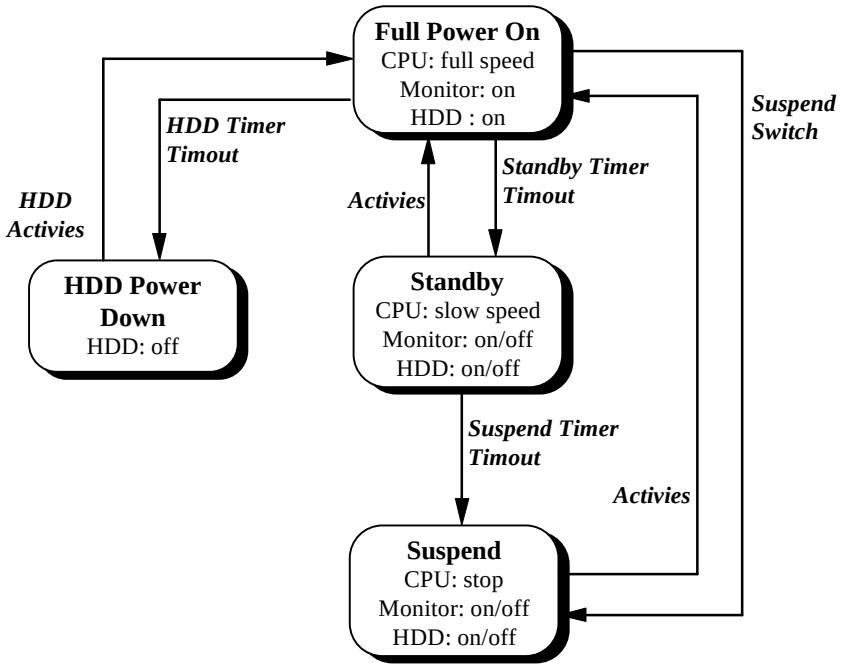
Caution*: You can not use both USB driver and USB legacy keyboard at the same time. Disable "USB Legacy Support" if you have USB driver in the operating system.*

3.2.4 Power Management Setup

To take advantage of the power-management feature, select **Power Mgmt** from the Setup menu. The following items appear:



The states transition of power management is shown below. Note that monitor and HDD can be on or off at Standby and Suspend state, depend on the setting in "Green Monitor Power Down State" and "Hard Disk Power Down Mode":



Power Mgmt --> Power Management/APM

Power Management/APM
Disabled
Enabled
Instant-On

This item is the global control to enable or disable the advanced power-management function.

Power Mgmt --> Instant-OnTimeout (Minutes)

Instant-On Timeout (Minutes)
Disabled
1
.....
15

This item is configurable only if the Power Management/ APM item is set to Instant On. This lets you specify when to resume system power after being in power-saving mode for a certain period of time.

Power Mgmt --> Green Monitor Power Down State

Green Monitor Power Down State
Standby
Suspend
Off

This function lets you select at which state to power down your monitor. BIOS blanks the screen and power down the monitor by special signal (VSYNC, HSYNC) on the monitor connector. You need DPMS (Display Power Management Standard) monitor to support power down function.

Power Mgmt --> Display Card Power Down Mode

Display Card Power Down State
Disabled
Standby
Suspend

This option allows you to select at which state to power down your system display card. You need display card which supports power down command for this function.

Power Mgmt --> Hard Disk Power Down Mode

Hard Disk Power Down State
Disabled
Standby
Suspend

This option allows you to select at which state to power down your IDE hard disk. The reduction of power consumption is achieved by shutting down the spindle motor of HDD. You need HDD which supports power down command for this function.

Power Mgmt --> Hard DiskTimeout (Minutes)

Hard Disk Timeout (Minute)
Disabled
1
.....
15

This option lets you set the time of your IDE hard disk to go into power down state (spindle motor off) when there is no hard disk activities. This item is independent with the power state described above (Standby and Suspend).

Power Mgmt --> StandbyTimeout (Minutes)

Standby Timeout (Minute)
Disabled
1
.....
15

This item lets you set the time of your system to go into Standby power down state when there is no system activities. In Standby state, CPU clock is slowdown according to the ratio set in "Slow Clock Ratio" below. Any event detected returns the system to full power. The system activity(or event) is detected through monitoring of IRQ signals.

Power Mgmt --> SuspendTimeout (Minutes)

Suspend Timeout (Minute)
Disabled
1
.....
15

This item lets you set the time (after Standby) to go into Suspend power down state when there is no system activities. System goes to Standby first and then goes to Suspend state. In Suspend state, CPU clock is stopped. Any event detected returns the system to full power. The system activity(or event) is detected through monitoring of IRQ signals.

Power Mgmt --> Slow Clock Ratio

Slow Clock Ratio
1:1
1:2
1:4
1:8
1:16
1:32
1:64
1:128

When the system enters the Standby state, the CPU clock count in a giving time (not frequency) is reduced by the ratio set in this item, actually, the period per CPU clock is not changed. For example, 30ns clock period of 66MHz CPU clock is not changed at Standby state, chipset generates STPCLK (stop clock) signal periodically to prevent CPU for accepting clock from clock generator. For full power on, the CPU can receive 66M count in one second, but if the ratio is set at 1:2, the CPU will only receive 33M clock count in one second at Standby state. This will effectively reduce CPU speed as well as CPU power. This method is also known as Clock Throttling.

Power Mgmt --> IRQ3(COM2)
Power Mgmt --> IRQ4(COM1)
Power Mgmt --> IRQ5(Network/Sound or Others)
Power Mgmt --> IRQ7(Printer or Others)
Power Mgmt --> IRQ8(RTC)
Power Mgmt --> IRQ9(Video or Others)
Power Mgmt --> IRQ10(SCSI or Others)
Power Mgmt --> IRQ11(SCSI or Others)
Power Mgmt --> IRQ12(PS/2 Mouse or Others)
Power Mgmt --> IRQ13(Floating Point of CPU)
Power Mgmt --> IRQ14(IDE1)
Power Mgmt --> IRQ15(IDE2)

IRQ3
Ignore
Monitor
WakeUp
Both

The system activities are monitored through the specified IRQ signals to determine the transition of power state. Set parameter to **Monitor** allows system to monitor the IRQ and wait for timeout to go into Standby or Suspend state. Set parameter to **WakeUp** allows system to back to full power if the activity associated with this IRQ is detected. **Both** has function of both Monitor and WakeUp.,

Note: *The system activities listed above are general PC standard, special card may require special IRQ, refer to card manual for correct IRQ setting. You may also refer to Win95 "Device Manager" for which IRQ is assigned to which device.*

Important*: The IRQ8 is fixed for RTC and IRQ13 is fixed for floating point. They are recommended to set at Ignore. If IRQ8 is not Ignore, OS/2 may fail to go into Standby/Suspend, because of the periodically RTC interrupt.*

Important*: Network workstation will periodically receive the polling command from network server, if the IRQ of network card (normally IRQ5 or IRQ3) is not set to Ignore, the system may fail to go into Standby/Suspend*

3.2.5 PCI/PnP Setup

The PCI/PnP Setup allows you to specify the setting for your PCI devices. The items below appear if you select **PCI/PnP** from the Setup menu.

Note: *You can press <Ins> to enter the BIOS Setup screen. This procedure resets PnP configuration information and reconfigure PnP resource again, it allows you to solve an IRQ/DMA/Memory resources conflict.*

PCI/PnP Setup

Plug and Play Aware OS	: No
PCI VGA Palette Snoop	: Disabled
PCI IDE Card	: Auto
PCI IDE Primary IRQ	: Disabled
PCI Slot1 IRQ Priority	: Auto
PCI Slot2 IRQ Priority	: Auto
PCI Slot3 IRQ Priority	: Auto
PCI Slot4 IRQ Priority	: Auto
DMA Channel 0	: PnP
DMA Channel 1	: PnP
DMA Channel 3	: PnP
DMA Channel 5	: PnP
DMA Channel 6	: PnP
DMA Channel 7	: PnP
IRQ3	: PCI/PnP
IRQ4	: PCI/PnP
IRQ5	: PCI/PnP
IRQ7	: PCI/PnP
IRQ9	: PCI/PnP
IRQ10	: PCI/PnP
IRQ11	: PCI/PnP
IRQ14	: PCI/PnP
IRQ15	: PCI/PnP
Reserved Memory Size for ISA	: Disabled
Reserved Memory Base for ISA	: C8000

PCI/PnP --> Plug and Play Aware O/S

Plug and Play Aware O/S
No
Yes

Normally the PnP resource is allocated by BIOS during POST (Power-On Self Test). If you are using PnP operating system (such as Windows 95), you may set this item to Yes, which informs BIOS to configure only the resources needed for boot (VGA/IDE or SCSI). The rest of system resources will be allocated by PnP operating system.

PCI/PnP --> PCI VGA Palette Snoop

PCI VGA Palette Snoop
Disabled
Enabled

Enable this item informs the PCI VGA card to be quiet preventing conflict when the palette register is updated (accept data without responding any communication signals). This is only useful for two display cards use the same palette address and plugged on the PCI bus together (such as MPEQ or Video capture), one is set to be quiet and the other is set to act normally.

PCI/PnP --> PCI IDE Card

PCI IDE Card
Auto
Slot1
Slot2
Slot3
Slot4

Some old PCI IDE add-on cards are not fully PnP compatible. You need to specify the slot you are using for BIOS to configure correct PnP resources. This function allows you to select the PCI slot for any of PCI IDE add-on card present. Set this item to **Auto** to automatically configure the installed PCI IDE card.

PCI/PnP --> PCI IDE Primary IRQ
PCI/PnP --> PCI IDE Secondary IRQ

PCI IDE Primary IRQ
Disabled
INTA
INTB
INTC
INTD
Hardwired

These two items are in conjunction with "PCI IDE Card" to decide IRQ routing of the primary or secondary channel of the PCI IDE add-on card (not the onboard IDE). Each PCI slot has 4 PCI interrupts aligned as the table below, you have to specify the slot in "PCI IDE Card" above and choose the PCI interrupt (INTx) according to the interrupt connection on the card. There are also cards support legacy mode only, which is, connect IRQ directly through small extension card on ISA bus, not through PCI interrupt. In such case, select Hardwired.

PCI Slot	Location 1 (pin A6)	Location 2 (pin B7)	Location 3 (pin A7)	Location 3 (pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5 (if any)	INTD	INTA	INTB	INTC

PCI/PnP --> PCI Slot1 IRQ Priority
PCI/PnP --> PCI Slot2 IRQ Priority
PCI/PnP --> PCI Slot3 IRQ Priority
PCI/PnP --> PCI Slot4 IRQ Priority

PCI Slot1 IRQ Priority
Auto
None
3
4
5
7
9
10
11
12

These items let you specify the preferred IRQ priority for each PCI slot. PnP BIOS will assign the IRQ to each slot according to the priority of these settings. Set to **Auto** for PnP BIOS to configure IRQ automatically without any priority preferred. Set to None if you does not want PnP BIOS to allocate any IRQ for this slot (such as VGA card). Set to specific IRQ if you prefer this IRQ for this card on this slot.

PCI/PnP --> DMA Channel 0
PCI/PnP --> DMA Channel 1
PCI/PnP --> DMA Channel 3
PCI/PnP --> DMA Channel 5
PCI/PnP --> DMA Channel 6
PCI/PnP --> DMA Channel 7

DMA Channel 0
PnP
ISA

If your ISA card is not PnP compatible and needs special DMA channel to support its function, specify the DMA channel as **ISA**, which informs PnP BIOS to reserve this DMA channel for the this legacy ISA card. The default is **PnP**. PCI card has no DMA channel.

PCI/PnP --> IRQ3(COM2)
PCI/PnP --> IRQ4(COM1)
PCI/PnP --> IRQ5(Network/Sound or Others)
PCI/PnP --> IRQ7(Printer or Others)
PCI/PnP --> IRQ9(Video or Others)
PCI/PnP --> IRQ10(SCSI or Others)
PCI/PnP --> IRQ11(SCSI or Others)
PCI/PnP --> IRQ14(IDE1)
PCI/PnP --> IRQ15(IDE2)

IRQ3
PCI/PnP
ISA

If your ISA card is not PnP compatible and needs special IRQ to support its function, specify the IRQ as **ISA**, which informs PnP BIOS to reserve this IRQ for the this legacy ISA card. The default is **PCI/PnP**. PCI card are always PnP compatible (except old PCI IDE card).

PCI/PnP --> Reserved Memory Size for ISA

Reserved Memory Size for ISA
Disabled
16K
32K
64K

If your ISA card is not PnP compatible and needs special memory space to support its function, specify the memory size in this item, which informs PnP BIOS to reserve the memory space for legacy ISA card. The default is **Disabled**.

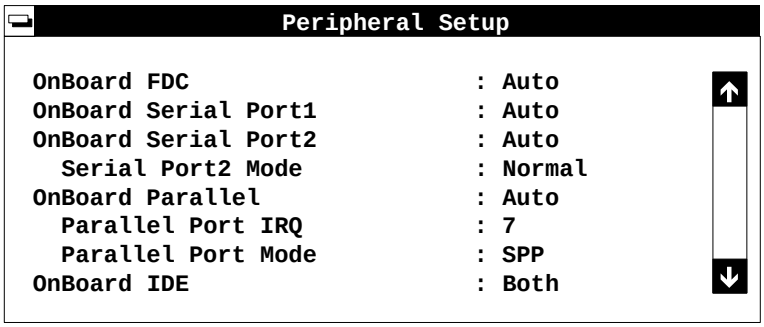
PCI/PnP --> Reserved Memory Base for ISA

Reserved Memory Base for ISA
C0000
C4000
C8000
CC000
D0000
D4000
D8000
DC000

This item is in conjunction with "Reserved Memory Size for ISA" to specify memory space of the non-PnP compatible ISA card. This item sets the memory base (start address), the memory size is specified above.

3.2.6 Peripheral Setup

Select Peripheral from the Setup menu and the following screen appears.



Peripheral -->OnBoard FDC

OnBoard FDC
Auto
Disabled
Enabled

This item enables or disables the onboard floppy drive controller.

Peripheral -->OnBoard Serial Port1
Peripheral -->OnBoard Serial Port2

OnBoard Serial Port1
Auto
Disabled
3F8h
2F8h
3E8h
2E8h

These two items allow you to select the address for onboard serial ports. Selecting Disabled deactivates the port.

Peripheral --> Serial Port2 Mode

Serial Port2 Mode
Normal
HPSIR
ASKIR

This item is configurable only if the " OnBoard Serial Port2" is enabled. This allows you to specify the mode of serial port2. The available mode selections are:

- **Normal -** Sets serial port 2 to operate in normal mode. This is the default setting.

- **HPSIR -** Select this setting if you have installed Infrared module on the IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 115K baud.

- **ASKIR -** Select this setting if you have installed Infrared module on the IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 19.2K baud.

Peripheral --> OnBoard Parallel Port

OnBoard Parallel Port
Auto
Disabled
378h
278h
3BCh

This item allows you to select the address for the parallel port. Selecting Disabled deactivates the parallel port.

Peripheral --> Parallel Port IRQ

Parallel Port IRQ
5
7

This item is configurable only if the "Onboard Parallel Port" is NOT set to Auto. This allows you to set an IRQ for the parallel port function. The default is 7 for first parallel printer port.

Peripheral --> Parallel Port Mode

Parallel Port Mode
SPP
EPP
ECP

This item specifies the parallel port mode. The mode options are SPP (Standard and Bi-direction Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port). SPP is the IBM AT and PS/2 compatible mode. EPP enhances the parallel port throughput by directly write/read data to/from parallel port without latch. ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

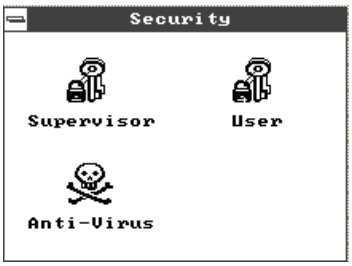
Peripheral -->OnBoard IDE

OnBoard IDE
Disabled
Primary
Secondary
Both

This item enables or disables the onboard IDE controller. Select **Primary** to enable primary channel and disable secondary channel. Select **Secondary** to disable primary and enable secondary channel. Select **Both** to enable both of them.

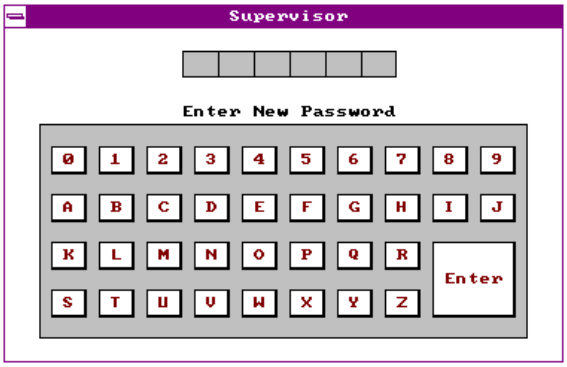
3.3 Security Setup

The Security window contains the password and anti-virus features.



Supervisor Password

The use of password prevents unauthorized use of your computer. If you set a Supervisor password, the system prompts for this password before granting access to Setup or system boot, depending on the Password Check setting in the "Advanced Setup" menu (refer to section 3.2.2). To set a Supervisor password, select **Supervisor** from the Security window. The following screen appears:



Follow these steps to set up a password using the keyboard or mouse:

1. Type/click in a six-character password using letters, numbers, or a combination of both. When you type the characters, they appear as asterisks on the password screen boxes.

2. Press or click on <Enter>.

3. Retype the password when a password confirmation box appears asking you to retype the password.

User Password

To set a User password, select **User** from the Security window. The screen and procedures are similar as Supervisor password described above.

Note: *The Supervisor and User password are currently implemented the same privilege to access the same system information.*

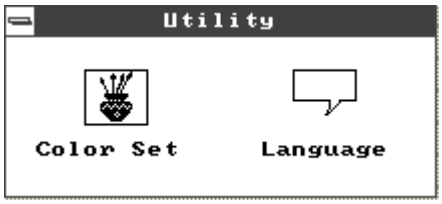
Anti-Virus

Anti-Virus
Disabled
Enabled

The Anti-Virus protection option allows you to enable or disable the virus protection feature. If enabled, BIOS issues warning when boot sector of IDE HDD is going to be modified.

3.4 Utility Setup

The Utility window lets you change WinBIOS Setup colors and language setting.



Color Set

Color Set
LCD
Army
Pastel
Sky

The Color Set allows you to select your desired background color for AMI WinBIOS.

Language

Language
English

The system language currently supported is only English. Therefore, this option is non-configurable and is for display only.

3.5 Default Setup

The Default window allows you to select two sets of AMI BIOS default setting (**Optimal** and **Turbo**).

Original

Actually, Original is not a set of default setting, it is a little like "Undo", choose Original if you change some setting and you don't want to save them.

Optimal

Select Optimal to load the optimal default value. Optimal is relatively saver than Turbo, It is the setting for general optimal performance. We recommend to use Optimal if you have large memory size and full loading of add-on card, for example, file server using double side 8MB SIMM x4 and SCSI plus Network card occupy many of the PCI and ISA slots. Optimal is not the slowest setting of this mainboard, if you need to verify any unreliable problem, you may set manually in "Advanced Setup" and "Chipset Setup" to get slowest and most save setting.

Turbo

Turbo default value has better performance than Optimal, it is not the best performance setting of this mainboard but it is setting qualified by AOpen RD and QA department that we think it is reliable if you have limited add-on card with light loading of memory (for example, VGA/Sound and two SIMMs only). If you need best performance, you may set manually in "Chipset Setup" to get proprietary setting, be sure you understand every item in "Chipset Setup". The performance difference of Optimal and Turbo is normally around 3% to 10%, depending on chipset and application.

3.6 Exiting Setup

Carefully check your new settings when you have finished configuring the system. If correct, write them down and keep the recorded values in a safe place. If in the future, the battery loses power or the CMOS chip is damaged, you will know what values to enter when you rerun setup.

Press <Esc> and select **Save changes and Exit** to save the changes that you made. Select **Do not save changes and Exit** to leave setup without saving your changes. Select **Continue** if you want to make any more configuration changes.

3.7 Onboard NCR SCSI BIOS

The NCR 53C810 SCSI BIOS resides in the same flash memory chip as the system BIOS. The onboard NCR SCSI BIOS is used to support NCR 53C810 SCSI control card without the need of BIOS code on the SCSI card.

The NCR SCSI BIOS directly support DOS, Windows 3.1 and OS/2, but you may get better performance by using drivers come from the NCR SCSI card vendor or from operating system (such WIndows 95). For detail, refer to the installation manual of your NCR 53C810 SCSI card.

3.8 AMI Flash Utility

The AMI Flash Utility allows you to upgrade the system BIOS. To get the AMI flash utility and the upgrade BIOS file, contact your local distributor or visit our homepage at **http://www.aopen.com.tw** . The file name of AMI flash utility is AMIFLASH.EXE, run this program under DOS, follow the instruction on the screen, actually, you need only input the BIOS file name. After programming, reboot your system for the new BIOS to take effect.

***Warning**: Make sure you use AMI Flash Utility version 5.23 or later, the version before 5.23 has bug to program INTEL 12V Flash ROM, and after the programming, the system may fail to reboot.*

***Warning**: Be sure you get the correct BIOS file and carefully read the instruction and notice from AOpen homepage. Use incorrect BIOS file on incorrect version of mainboard may damage your system.*

Appendix A

Jumper Table Summary

Setting the CPU Voltage

JP11	CPU Core Voltage (Vcore)
1-2	3.45V (default for P54C)
3-4	3.52V (Cyrix or AMD K5)
5-6	2.5V
7-8	3.2V (AMD K6-233)
9-10	2.8V (PP/MT P55C)
11-12	2.9V (AMD K6-166/200)

JP12	I/O Voltage (Vio)
1-2	3.43V (default)
3-4	3.52V

JP3	JP13	CPU Type (Vcpuio)
1-2 & 3-4	Open	Single voltage CPU, Vcpuio = Vcore , (default).
Open	1-2 & 3-4	Dual voltage CPU, Vcpuio = Vio, (PP/MT P55C).

Warning: *The heat dissipation of Intel PP/MT-233Hz, AMD K6-200/233MHz exceed the original design of this mainboard. Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6-200/233 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.*

Jumper Table Summary

CPU Type	Vcore	Vio	Vcpuio	JP11	JP12	JP3	JP13
INTEL P54C	3.43V	3.43V	Vcore	1-2	1-2	1-2 & 3-4	Open
INTEL PP/MT	2.8V	3.43V	Vio	9-10	1-2	Open	1-2 & 3-4
AMD K5	3.52V	3.43V	Vcore	3-4	1-2	1-2 & 3-4	Open
AMD K6-166/200	2.9V	3.43V	Vio	11-12	1-2	Open	1-2 & 3-4
AMD K6-233	3.2V	3.43V	Vio	7-8	1-2	Open	1-2 & 3-4
Cyrix 6x86	3.52V	3.43V	Vcore	3-4	1-2	1-2 & 3-4	Open
Cyrix 6x86L	2.8V	3.43V	Vio	9-10	1-2	Open	1-2 & 3-4

Selecting the CPU Frequency

JP10	CPU Frequency Ratio
1-2 & 3-4	1.5x (3.5x)
3-4 & 5-6	2x
5-6 & 7-8	2.5x (1.75x)
1-2 & 7-8	3x

JP1	CPU External Clock
1-2 & 3-4	50MHz
Open	55MHz
1-2	60MHz
3-4	66MHz

Tip: *Intel PP/MT 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio..*

Intel Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
P54C 75	75MHz =	1.5x	50MHz	1-2 & 3-4	1-2 & 3-4
P54C 90	90MHz =	1.5x	60MHz	1-2 & 3-4	1-2
P54C 100	100MHz =	1.5x	66MHz	1-2 & 3-4	3-4
P54C 120	120MHz =	2x	60MHz	3-4 & 5-6	1-2
P54C 133	133MHz =	2x	66MHz	3-4 & 5-6	3-4
P54C 150	150MHz =	2.5x	60MHz	5-6 & 7-8	1-2
P54C 166	166MHz =	2.5x	66MHz	5-6 & 7-8	3-4
P54C 200	200MHz =	3x	66MHz	1-2 & 7-8	3-4

Intel Pentium	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
PP/MT 150	150MHz =	2.5x	60MHz	5-6 & 7-8	1-2
PP/MT 166	166MHz =	2.5x	66MHz	5-6 & 7-8	3-4
PP/MT 200	200MHz =	3x	66MHz	1-2 & 7-8	3-4
PP/MT 233	233MHz =	3.5x	66MHz	1-2 & 3-4	3-4

Cyrix 6x86	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
P120+	100MHz =	2x	50MHz	3-4 & 5-6	1-2 & 3-4
P133+	110MHz =	2x	55MHz	3-4 & 5-6	Open
P150+	120MHz =	2x	60MHz	3-4 & 5-6	1-2
P166+	133MHz =	2x	66MHz	3-4 & 5-6	3-4

AMD K5	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
PR75	75MHz =	1.5x	50MHz	1-2 & 3-4	1-2 & 3-4
PR90	90MHz =	1.5x	60MHz	1-2 & 3-4	1-2
PR100	100MHz =	1.5x	66MHz	1-2 & 3-4	3-4
PR120	90MHz =	1.5x	60MHz	1-2 & 3-4	1-2
PR133	100MHz =	1.5x	66MHz	1-2 & 3-4	3-4
PR166	116MHz =	1.75x	66MHz	5-6 & 7-8	3-4

AMD K6	CPU Core Frequency	Ratio	External Bus Clock	JP10	JP1
PR2-166	166MHz =	2.5x	66MHz	5-6 & 7-8	3-4
PR2-200	200MHz =	3x	66MHz	1-2 & 7-8	3-4
PR2-233	233MHz =	3.5x	66MHz	1-2 & 3-4	3-4

Disabling the Onboard Super I/O

JP8	Onboard Super I/O
1-2	Enable (default)
2-3	Disable

Jumper Table Summary

Disabling the PS/2 Mouse

JP4	PS/2 Mouse
Short	Enable (default)
Open	Disable

Clear CMOS

JP5	Clear CMOS
1-2	Normal operation(default)
2-3	Clear CMOS

INTEL Flash ROM Programming

JP1301	JP1302	Flash ROM Programming
2-3	2-3	Enable (default)

Note: *JP1301 and JP1302 is only used for INTEL flash ROM programming, they are no effect for other type Flash ROM, such as SST or Winbond.*

Warning: *JP1301 and JP1302 must always be enabled, fail to do so causing inconsistent BIOS code, and may damage the system.*